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Surface functionalization of lignin constituent of coconut fibers via laccase-catalyzed biografting for development of antibacterial and hydrophobic properties

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Abstract

Biografting is a safe and clean procedure for surface functionalization of lignin-rich natural fibers replacing toxic chemicals with environmentally friendly enzyme catalysis. In the present work, laccase-catalyzed biografting of ferulic acid was carried out on the lignin component of coconut fibers to impart moisture retention and microbial resistance. Fourier transform infrared spectroscopy, X-ray diffraction, and scanning electron micrograph studies clearly indicate that ferulic acid is incorporated into the coconut coir lignin. Biografting was found to improve the thermal, antibacterial and hydrophobic properties of coconut fibers.

Key words: Biografting, laccase, lignin, antibacterial property, moisture retention.

1. Introduction

Plenty of chemical methods are available for surface modification of natural fibers, but the difficulty is in the appropriate handling and disposal of the large amounts of hazardous

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